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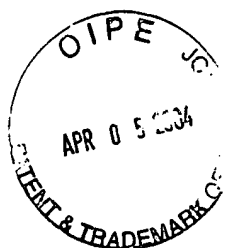
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**APPENDIX A**  
**EXEMPLARY SUPPORT FOR CLAIM 161**

<b>'454 Application Claim</b>	<b>Exemplary Support in the '454 Specification</b>
<p><b>16.</b> A method of lithographically printing images on a receiving area, comprising in order:</p> <p>(a) providing a lithographic plate comprising (i) support; and (ii) a heat-sensitive layer comprising a polymerizable monomer or oligomer, an initiator capable of initiating the polymerization of said monomer or oligomer, and an infrared absorbing dye; wherein said heat-sensitive layer is capable of polymerizing and/or crosslinking upon exposure to an infrared laser radiation, is soluble and on-press developable with ink and/or fountain solution;</p> <p>(b) image exposing the plate with the infrared laser radiation to cause polymerizing and/or crosslinking of the heat-sensitive layer in the exposed areas; and</p> <p>(c) contacting said exposed plate with ink and/or fountain solution on a lithographic press to remove the heat-sensitive layer in the non-polymerized and/or non-crosslinked areas, and to lithographically print images from said plate to the receiving area.</p>	<p>p. 1, ll. 11-14</p> <p>p. 8, ll. 4-19 p. 88, ll. 16-17; p. 68, l. 11 p. 25, ll. 7-13; p. 18, ll. 6-9 p. 68, l. 11</p> <p>p. 51, l. 9 p. 44, ll. 17-21 p. 113, ll. 10-12; p. 32, ll. 1-4 p. 107, ll. 11-14</p> <p>p. 125, ll. 10-11 p. 113, ll. 10-16 p. 126, l. 11 – p. 127, l. 5</p> <p>p. 114, l. 16 – p. 115, l. 11</p> <p>p. 130, ll. 7-12</p>

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1 The identified support is merely exemplary, and is not meant to be exhaustive. Applicant reserves the right to recite additional support for these claims at a later time, if necessary.





## APPENDIX B

### **Claim 1 of the '571 patent:**

A method of lithographically printing images on a receiving medium, comprising in order:

(a) providing a lithographic plate comprising (i) a substrate; and (ii) a thermosensitive layer comprising a polymerizable monomer or oligomer, an initiator capable of initiating the polymerization of said monomer or oligomer, and an infrared absorbing dye or pigment; wherein said thermosensitive layer is capable of hardening upon exposure to an infrared laser radiation, is soluble or dispersible in and on-press developable with ink and/or fountain solution, and exhibits an affinity or aversion substantially opposite to the affinity or aversion of said substrate to at least one printing liquid selected from the group consisting of ink and an adhesive fluid for ink;

(b) imagewise exposing the plate with the infrared laser radiation to cause hardening of the thermosensitive layer in the exposed areas; and

(c) contacting said exposed plate with ink and/or fountain solution on a lithographic press to remove the thermosensitive layer in the non-hardened areas, and to lithographically print images from said plate to the receiving medium.

Or

### **Claim 16 of the '454 application:**

A method of lithographically printing images on a receiving area, comprising in order:

(a) providing a lithographic plate comprising (i) support; and (ii) a heat-sensitive layer comprising a polymerizable monomer or oligomer, an initiator capable of initiating the polymerization of said monomer or oligomer, and an infrared absorbing dye or pigment; wherein said heat-sensitive layer is capable of cross-linking upon exposure to an infrared laser radiation, is soluble and on-press developable with ink and/or fountain solution;

(b) image exposing the plate with the infrared laser radiation to cause cross-linking of the heat-sensitive layer in the exposed areas; and

(c) contacting said exposed plate with ink and/or fountain solution on a lithographic press to remove the heat-sensitive layer in the non-polymerized and/or non-crosslinked areas, and to lithographically print images from said plate to the receiving area.

JOHN E. COGOLI  
Hartford Public High School  
Hartford, Connecticut



# PHOTO- OFFSET FUNDAMENTALS

McKNIGHT & McKNIGHT

Publishing Company

Bloomington, Illinois

### Offset

In the offset process, the printing image is drawn by hand, typed or prepared photographically on the surface of a thin, flat offset plate. This offset plate is then mounted on the plate cylinder of the offset press. During operation of the offset press, the inked image of the offset plate is printed onto the rubber-covered surface of a blanket cylinder. In turn, the blanket cylinder transfers (or "offsets") its printed image onto the paper which is fed between the blanket cylinder and the impression cylinder.

### Net Value of Printed Products by Processes

Bureau of Census figures show that offset printed (lithographed) products with a total value of \$1,895,707,000 were produced in 1963.\* This represents a 46% gain over the value of these products in 1958, and also indicates the tremendous growth in importance of the offset process.

Letterpress printing, in the same period, made a gain of 10.4%. It produced, in 1963, products having a value of \$2,380,560,000.

These figures indicate that letterpress printing is still the "giant" of the industry, but that offset printing is second in production importance, and is growing rapidly.

The third most important process, dollar-wise, is gravure, with a value of \$287,187,000 in the year 1963.

That same year, engraving and silk screen accounted for values of \$87,392,000 and \$69,225,000, respectively. It may be observed that the value of products printed by each of these processes has been growing.

### Basic Theory of Offset Printing

In this book our study will be confined to the offset process of printing. It should be noted that there are several additional names by which the offset process is known: *photo-offset*, *lithography*, *photo-lithography*, *photo-offset lithography*, and *offset lithography*. As generally used, the above names refer to one and the same process. This writer prefers the

\*The latest government data at this printing.

more descriptive term *photo-offset lithography*, but has for convenience used the shorter term *offset* throughout the greater part of this book.

Offset printing is a *planographic method* of printing; that is, it employs a *flat* printing plate on which the image (or printing area) is level with the non-printing area. In other words, the part of the plate which does the printing is neither raised above, nor cut below, the surface of the plate.

### Theory

Offset printing can be done from a flat plate because of a fundamental chemical fact: "grease and water do not readily mix."

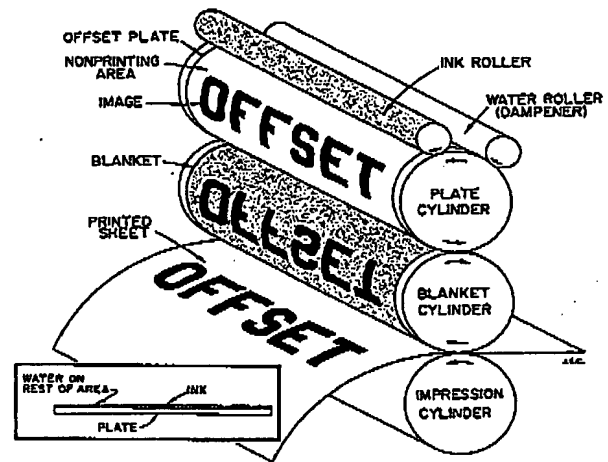


Fig. 5. Offset Printing

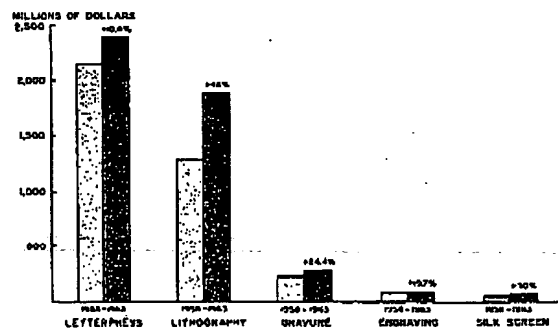


Fig. 6. Commercial Printing — Value of Receipts by Process

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#### 4 Photo-Offset Fundamentals

**The plate.** As purchased or prepared in the shop, the offset plate is a thin sheet of paper or metal, so treated chemically and mechanically that its surface will readily retain a thin film of applied moisture.

The message to be printed (the image) is placed on this plate by a photographic-chemical process, employing in its final steps the

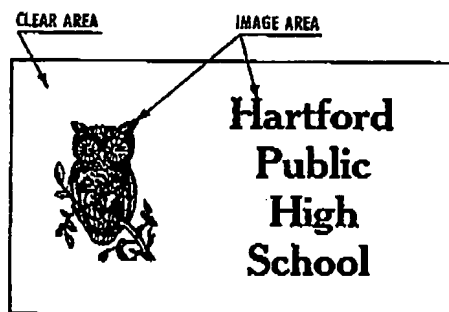


Fig. 7. An Offset Plate Has Two Areas

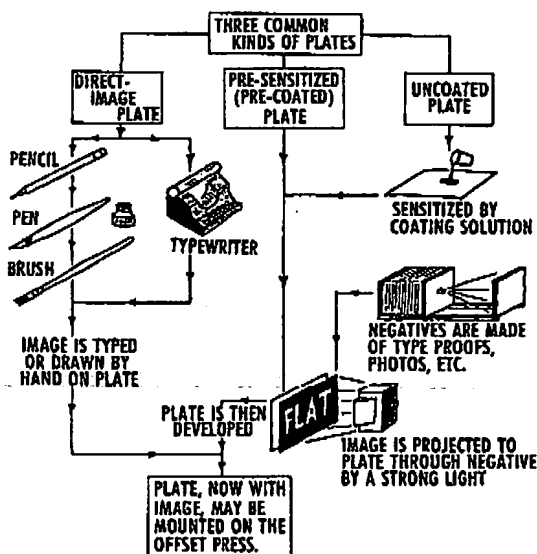


Fig. 8. Producing a Printing Image on the Surface of Three Kinds of Offset Plates. The pencil, ink and typewriter ribbon used for preparing the direct-image plate are especially made for lithographic purposes. In developing the presensitized and uncoated plates which are coated in the shop, a greasy lithographic developing ink is used to make the image ink-receptive.

developing of the image by use of a greasy or "fatty" ink. The image may also be created directly on the plate by typing, hand lettering, or drawing, in each case using special lithographic typewriter ribbons, pencils, tusche or ink which will cause a "greasy" image on the plate. (Platemaking is discussed in more detail in Chapter 12.)

A completely prepared offset plate, then, actually contains two separate and distinct areas on its flat surface: (1) the *image* (printing) area, which is composed of greasy or fatty ink, and (2) the *clear* (non-printing) area. (See Fig. 7.)

**Water repellent and ink receptive.** If a water-saturated cloth pad is passed over the entire surface of a completed offset plate, it will be observed that a thin film of moisture will adhere to the clear areas of the plate. Moisture will not adhere to the inked image area — instead, it actually will be seen to run off and pull away from the greasy-inked image.

If, now, a brayer charged with greasy lithographic ink is passed over the entire plate, it will be observed that a deposit of ink is added to the greasy-ink image, and that no ink adheres to the moisture-dampened clear areas of the plate.

The following conclusions are then evident:

- (1) The greasy-inked image is *receptive* to ink, but will *repel* water.
- (2) The dampened clear area of the plate is *receptive* to water, but will *repel* ink.

However, if an ink-charged brayer is passed over an offset plate which *has not* been moistened, the ink will adhere to the entire surface of the plate — image and clear areas alike.

**Water and ink balance.** On commercial offset presses, the water and ink are fed automatically to the offset plate. The press operator maintains and controls a judicial balance between the amounts of ink and water which are allowed to reach the plate. This balance insures that only the image portions of the plate will print.

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### The Offset Press

A schematic drawing of an offset press is shown in Fig. 9. This drawing shows only the basic, fundamental parts of an offset press. Actual offset presses have a great many more parts.

Note that the offset press has three large cylinders:

- (1) the *plate cylinder*, on which is mounted the offset plate
- (2) the *blanket cylinder*, which is covered with a rubber blanket
- (3) the *impression cylinder*, which has a smooth metal surface.

There are two fountains (reservoirs):

- (1) the *ink fountain*, which carries a supply of ink
- (2) the *water fountain*, which contains the plate-dampening solution.

Two series of rollers, one from the ink fountain and one from the water fountain, furnish ink and water to the plate.

Paper is fed automatically through the press and is stacked neatly after printing.

### Inking the Plate

When the press is started in motion, the water fountain roller is brought into contact with the plate, coating it with a film of moisture. The water adheres only to the clear area of the plate because the developed image repels the water.

The ink roller next contacts the plate. The ink adheres to the developed image, but is repelled by the water-covered clear area. By a carefully controlled feeding of water and ink, the offset plate is successfully inked in only the desired image areas.

### Printing

When the rubber-covered blanket cylinder is brought into contact with the plate cylinder, the *readable*\* inked image of the plate

\*Type matter which can be read normally from left to right is referred to as "readable", or "right reading"; if type matter is reproduced so it must be read from right to left on the page, it is called "unreadable", or "wrong-reading".

prints onto the blanket. The image printed on the blanket is a wrong-reading or mirrored image of the plate image.

Finally, the paper is passed through the press between the blanket and impression cylinders and is printed upon by the blanket

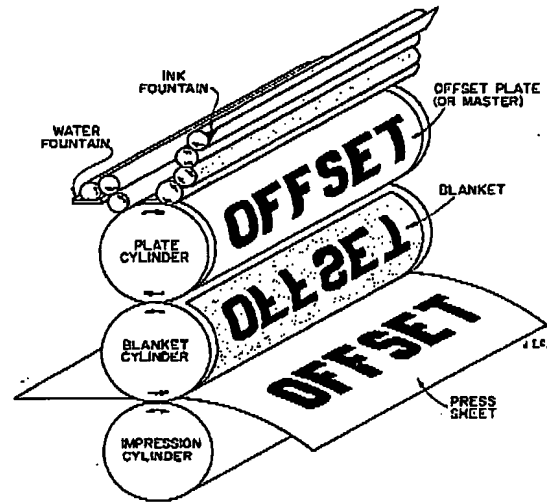


Fig. 9. Schematic Drawing of an Offset Press; from Plate, to Blanket, to Paper.

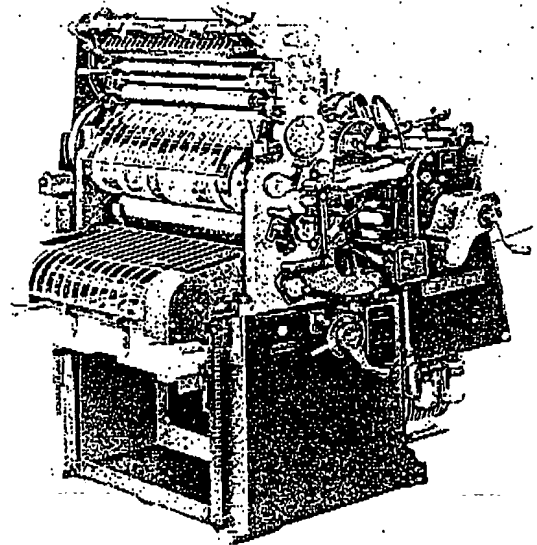


Fig. 10. ATF Chief 20A Offset Press  
(Courtesy American Type Founders Co., Inc.)

## 6 Photo-Offset Fundamentals

— the image being mirrored again, and appearing *readable* on the paper.

Note that the plate does not print on the paper. Instead, the plate prints on the blanket, and then the blanket image is transferred (or *offset*) to the paper, thus the term *offset printing*.

### Demonstrations

In addition to a study and discussion of the foregoing text material, the student will gain a deeper and fuller understanding of the theory and practice of fundamental offset principles if the instructor will actually demonstrate the principles involved.

### Platemaking and Presswork

The finest demonstration of offset principles would require that platemaking equipment and a simple offset press (such as a duplicator) be available.

Expose and develop a presensitized paper or metal plate, using an available stripped-up flat. Explain each step and the materials used.

Mount the plate on the press (which has been prepared for the printing operation). Show how the plate is dampened and how the plate image picks up a coverage of ink. Stop the press and allow the students to examine the plate.

Transfer the plate image to the blanket, and again stop the press. Point out how the blanket image is a "mirror image" of the plate image.

Take a few impressions and pass out the printed sheets to the students.

Close the demonstration by showing the students how the plate is preserved and stored for future use.

If preparations are made beforehand, the complete demonstration should not take more than twenty minutes, allowing ample time for the lively discussion which is sure to follow.

### Plate and Proof Press

If it is neither desirable nor convenient to demonstrate with an offset duplicator or off-

set press, much the same principles can be demonstrated with an offset plate and a letterpress proof press.

For this demonstration, build up the proof press bed with a block of wood and several sheets of thin cardboard so that the press gives a slight squeeze impression. Also ink up a hand brayer and an ink slab with offset ink.

Demonstrate the exposure and developing of an offset plate (as above) or take from storage a previously-used offset plate.

Place the plate, image side up, on the built-up bed of the proof press. Wash the preservative from the plate surface with sponge and water, and roll up the image with the hand brayer. It may require several passes with the brayer to build up the image with sufficient ink. If so, sponge off the plate with water between inkings. If water accumulates on the brayer, remove it by rolling the brayer on clean newsprint.

Place a sheet of printing paper on the inked plate, and pull an impression. Additional impressions may be taken if, before each additional impression, the plate is moistened and then inked.

This demonstration will show the "grease and water" theory, and also the "mirror reversal" of the plate image when it prints on the paper.

Conclude by showing how to prepare the plate for storage. Then hold a discussion on what has been demonstrated.

### Plate, Blanket and Proof Press

A third demonstration which may be made involves the same set-up of offset plate and proof press. In addition, an offset-press blanket, or a portion of one, is needed.

After washing off and rolling up the plate with ink, place the blanket over the plate and pull an impression on the proof press.

Remove the printed-upon blanket, and show that its image is a "mirror image" of the plate image.

Now, remove the offset plate from the proof press, and place the blanket (image side up) on the built-up proof press bed.

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Place a sheet of printing paper on the blanket and pull an impression. Show that the impression printed on the paper is a "right-reading" duplicate of the plate image.

In this demonstration, additional sheets may not be printed unless the blanket is washed between impressions. However, the inclusion of the blanket makes this a convincing demonstration.

Conclude, as before, with plate preservation and class discussion.

### Questions

1. Name eight materials on which printing is commonly done. Are there others?
2. What are the five major printing processes?
3. Describe the process of letterpress printing.
4. Why is screen printing so called?
5. Which of the five major printing processes is commonly used for printing on glass bottles? Why?
6. Which two of the major printing processes employ printing plates which do their printing from lines or dots below the surface of the plates?
7. What is meant by offset printing?
8. Why is the name "offset" used to describe this process?
9. What is the "grease and water" theory as applied to offset printing?
10. Why is a greasy (or fatty) ink used in offset printing?
11. With a dry offset plate on the press, which is applied first—water or ink? Why? What would happen if the other were applied first?
12. Give another name for the image portion of the offset plate.
13. Give at least two names for that portion of the offset plate which carries no image.
14. Suppose the plate image in Fig. 9 were reversed; left to right; would the image on the blanket then be readable or wrong reading? Would the resulting image appear on the paper in unreadable or readable form?

15. Define the following terms as they apply to offset printing:

- |                      |                        |
|----------------------|------------------------|
| a. Water receptive   | k. Water fountain      |
| b. Water repellent   | l. Water rollers       |
| c. Ink receptive     | m. Ink rollers         |
| d. Ink repellent     | n. Impression cylinder |
| e. Image area        | o. Readable image      |
| f. Clear area        | p. Wrong-reading image |
| g. Printing area     | q. Right-reading       |
| h. Non-printing area | r. Unreadable          |
| i. Blanket           | s. Mirrored image      |
| j. Ink fountain      |                        |

### Problems and Projects

1. Examine an offset press in the shop. Locate each of the basic parts shown in the schematic drawing in Fig. 9.
2. Examine a used offset plate in the shop. Ask if you may touch, and rub, the image with a fingertip. What can you say about the image?
3. Closely inspect two printed samples—one printed by letterpress, and the other printed by offset. Notice the outlines of the magnified letters of each sample. Describe what you see. Why is it so?
4. Clip and mount on a notebook page, five samples of printed matter, each printed by a different major process. Identify and label each according to the printing process used.

### New Words

- |                  |                  |
|------------------|------------------|
| 1. adhere        | 16. greasy       |
| 2. aluminum      | 17. illustration |
| 3. billions      | 18. importance   |
| 4. characterized | 19. industry     |
| 5. characters    | 20. letterpress  |
| 6. combination   | 21. lithographic |
| 7. controlled    | 22. lithography  |
| 8. cylinder      | 23. mirrored     |
| 9. duplicate     | 24. original     |
| 10. economically | 25. pantograph   |
| 11. engraving    | 26. pressure     |
| 12. essentially  | 27. processes    |
| 13. etching      | 28. production   |
| 14. fountain     | 29. rotogravure  |
| 15. fundamental  | 30. schematic    |

APPENDIX E

著者経歴

大正7年(1918年)東京生まれ。昭和13年東京高等工業学校印刷工芸科卒業後、ただちに母校に勤務。同校助教、終戦により退官。秀英堂印刷株式会社専務取締役。昭和28年写真印刷株式会社を設立。取締役社長。昭和42年麻州退任。

労働省技術検定専門調査委員、技能検定委員(オフセット印刷、プロセス製版カメラ、焼きつけ、校正)、東京都印刷工業組合常務理事、全日本印刷工業組合連合会構造改善総務班班長、日本印刷技術協会常務理事、東京都用業技能開発学院(身体障害者印刷施設)運営委員、日電製版株式会社常務取締役、芝居製版協同組合代表者、日本印刷学会評議員。

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### 3. PS版の構造

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#### 3.1. 支持体

PS版の支持体として、必要な特性はつぎのようなことであり、PS版はこれらの条件をだいたいかね備えている。

##### (1) 表面が強い親水性であること

平版印刷は、オイルと水の反発を利用したものであるから、平版板は、親油性画像の下に親水性支持体面を設けることが前提とされる。したがって、支持体面では、できるだけ親水性であるほうが望ましい。

##### (2) 感光層との接着がよいこと

印刷中に、画像がこぼれ落ちないような、強い接着性を示さなければならぬ。これは、ある程度、感光層側の問題でもある。

表面の物理的状態や、化学的処理によって、接着の良化がはかられている。

##### (3) 感光物に、化学的影響をあたえないこと

感光物は、化学的に不安定であるから、支持体によっては、影響をあたえるものがある。したがって支持体面は、感光物に対して、不活性であるような処理がほどこされる。

##### (4) 平面性がよいこと

ひずみ、うねり、カールのある板は、とくに校正機や焼付での操作時に、板の密着が悪く、精度の高い印刷物ができない。

##### (5) 傷のないこと

すり傷、押し傷の深いものは、(4~5 $\mu$ 以上)、そこにインキがつまったり(非画像部において)、インキが抜けたり(画像部において)する。キックは、

像のボケ、インキの着肉不良

##### (6) 寸度安定性のよいこと

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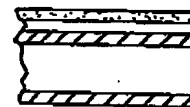


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落丁・乱丁本はお取り替えいたします。ISBN: 4-8-7086-201-8  
本書の無断転載・コピーを禁じます。

**分光光度計** spectrophotometer 分光器で得られるスペクトルの強度分布を測定する装置。波長領域により、紫外、可視、紫外、遠紫外などに分類される。また、分光方式によって格子、プリズム、フィルタ式とよばれる。透過と反射を分光透過率と分光反射率で測定する。材質の測定や、含有成分の定量にも用いられる。

**分光透過率** spectral transmittance 光の波長ごとに測定した物質の透過率。透過性のある物質の濃度や溶液の測定など広い範囲で利用されている。

**分光反射率** spectral reflectance 光の波長ごとに測定した物質の反射率。非透過性の物質の濃度など広い範囲で利用されている。

**分散** dispersion 太陽光などの光がプリズムなどを通過することにより、波長によって光が分けられる現象。分散させる素子としてはプリズムや回折格子などがある。分散を利用して任意の波長の取出しが可能となる。

**分散剤** dispersing agent 印刷インキをつくるさいに、顔料の粒子をビヒクル中に容易に分散させる作用を有する物質。この目的に表面活性剤をもちいる。

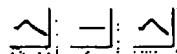
**分散処理** distributed processing 複数のコンピュータをローカルも含むネットワークで接続し協調して処理をすること。分散処理は大型による集中処理システムのスリム化・柔軟化が大きな目的であったため2種類の方法がある。ひとつは機能分散で、サーバと大型コンピュータのようにコンピュータの特徴によって作業を分担させること。もうひとつは作業量を分けることでシステム全体としての処理能力を上げる負荷分散である。

**噴射式インキ装置** cascade inking system グラビア印刷機で版面にインキを噴流として流しかける密閉インキ装置。

**分色刷り** progressive proofs カラー印刷をおこなうさいに、製版工程もしくは印刷工程において品質管理を目的としておこなう。各版ごとの校正刷り。また、各色ごとに色を重ねていく段階で得られる校正刷りに関しても分色刷りという。

**粉体インキ** powdered ink 静電印刷にもちいる粉体状のインキ。ゼログラフィ、エレクトロファックスなどの静電印刷において、粉体インキは静電潜像の電荷と反対の電荷をもち、種々の方法により現像定着する。固着剤はポリエステル樹脂やポリスチレン樹脂など100℃前後で軟化する熱可塑性樹脂をもちい、着色剤としてはカーボンブラック、ニグロシンなどをもちいる。インキの粒度は画像の濃度・鮮鋭度を左右するので一定の範囲に拘束される。

**粉体現像** powdered development 着色微粉末をもちいた現像方式。①電子写真においては、静電潜像を形成した後、粉末のトナー粒子を静電的に付着させる現像方法で、磁気ブラシ法、カスケード法などがある。②磁気ブラシ現像：カスケード現像 ③光照射により、接着性が変化する感光材料に着色粉末をふりかけて可視化する現像法。



**ベアラ** bearer ⇒ 胴枕

**ベアラコンタクト** bearer contact 平版印刷機の圧胴、ブランケット胴、版胴の両端にある金属製の支持体(胴枕)を互いに接触させて印刷すること。これにより印圧を一定に保つことができる。印圧を調整する場合はブランケット下の厚みなどを変更して調整する。

**平圧印刷機** platen press 平らな版面に平らな圧盤によって印圧を与え、被印刷物にインキを転写する印刷機。④床盤

**平凹版** deep-etch plate; deep etched offset plate 両像部を強くして耐刷力を増すため、両像部を3~7μm程度凹ませた平版。腐食式平凹版やメッキ式平凹版が代表的であるが、これらは現在ではほとんど使用されていない。

**平滑度** smoothness 紙の表面のなめらかさの度合い。紙の印刷適性を評価するうえで重要な性質であり、平滑度試験機で測定する。実際の印刷に必要な平滑度は、版面上のインキ皮膜が、その印圧によって紙面に転移される程度をもって決定される。

**平行折り** parallel fold ⇒ 巻折り

**平行光密度** specular density 透過物体の濃度は、入射光束と透過した光の光束をもとに算出するが、このとき、垂直に入射する光に対して、透過する光の中の純粋に直進成分のみをもちいて算出した濃度。④拡散光密度; 透過濃度

**平版** planographic plate 画像部と非画像部とがほぼ同一平面上に形成されている印刷版。非画像部は親水性または発油性とし、親油性の画像部だけに選択的にインキを供給し、紙などに転移させる。

**平版インキ** lithographic ink; planographic ink 平版印刷に使用するインキ。シート印刷機に使用する酸化重合タイプと、ウェブ印刷機に使用するヒートセットタイプがある。ロジン変性フェノール樹脂、アルキッド樹脂、植物油系乾性油、石油系溶剤からなるビヒクルに顔料をフラッシング、ロールミル、ビーズミルなどの方法で分散し、助剤として鉛系・コバルト系ドライヤ、表面強度を強くするためにはワックス、シリコンなどを入れる。最近、環境対策として石油系溶剤の代わりに大豆油を配合し、VOC(揮発性有機化合物)を減らす方向にきている。=オフセットインキ

**平版印刷** planography; lithography 版面に明確な高低がなく、一平面上に画像部と非画像部と形成されている版をもちいる印刷法。水と油脂とが互いに反発する性質を利用し、非画像部は化学処理によって親水性とし、画像部は写真焼付けまたは、転写によって親油性とし、版面に水とインキを交互に与えて印刷する。現在、平版印刷はほとんどすべてオフセット印